

REMARKS

The enclosed is responsive to the Examiner's Office Action mailed on June 6, 2007. At the time the Examiner mailed the Office Action claims 1-25 and 27-72, were pending. By way of the present response applicants have: 1) amended claims 1, 67, and 71; and 2) added no claims; and 3) canceled no claims. As such, claims 1-25, and 27-72 are now pending. Applicants reserve all rights with respect to the applicability of the doctrine of equivalents. Applicant's representative would like to thank the Examiner for agreeing on 10/5/07 to schedule an Examiner Interview when the Examiner is preparing the next Office Action.

Claim Rejections under 35 U.S.C. §102(e)

The Examiner has rejected claims 1-25 and 27-70 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 5,051,947 of Messenger et al. ("Messenger"). Applicants in the previous response had identified a variety of defects both in the rejection and Messenger. The instant Office Action states that the arguments are rendered moot, as applicants' amendments have necessitated a new ground of rejection. However, the Office Action then repeats the preceding rejection under Messenger, and "submits that Messenger teaches the claims as amended." Please note that MPEP §707.07(f) requires that the Examiner answer **all material traversed**. MPEP §707.07(f) specifically states that "where the applicant traverses **any rejection**, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and **answer the substance of it.**" (emphasis added). Applicants respectfully request that the next Office Action please respond to all of applicants' remarks traversing the following rejections, if such rejections are to be substantially maintained.

In light of the amendment and following remarks, applicants traverse the rejection of claims 1-25 and 27-70 under 35 U.S.C. §102(e) as being anticipated by Messenger and asserts that the said rejections have been overcome for at least the following reasons.

Claim 1 reads as follows:

A rule processor for conducting contextual searches, the processor comprising:

a plurality of M input payload search registers, wherein a data stream of content data to be searched is input into the plurality of payload search registers;

a search execution engine comprising:

a search array coupled to the plurality of M search registers, wherein the search array comprises:

a plurality of M rows of search array elements coupled to a plurality of M output match lines; and

a plurality of N columns of search array elements coupled to a plurality of N pattern input lines comprising a search pattern; wherein the search array comprises an array of M by N search array elements, and wherein the content data in the plurality of M search registers is replicated and stored N times in the plurality of N columns in the search array, and

a sorter coupled to the search array to perform one or more contextual searches on content in the search array via parallel pattern matching in response to executing one or more search instructions specifying the one or more pattern searches and presenting one or more patterns to the content, wherein the parallel pattern matching comprises performing a search query simultaneously within all M rows for the search pattern input by the N pattern input lines in one clock period.

(Amended claim 1)(emphasis added).

In contrast, Messenger fails to disclose or suggest all the limitations of claim 1.

Messenger, as interpreted by the rejection, is alleged to disclose *a plurality of M input payload*

search registers, wherein a data stream of content data to be searched is input into the plurality of payload search registers, citing figures 1 and 3, and abstract. Presumably the Office Action appears to be identifying row (a), in figure 3a, as the plurality of M input payload search registers. However, col. 6, lines 15-17, identifies figure 3a as “a table showing a simple search sequence using the structure of the invention,” which is a string of results and not an array structure having a plurality of M input payload search registers. Similarly, figure 1 is a block diagram, which fails to disclose or suggest a plurality of M input payload search registers. It is unclear from the rejection what specific structural components in Messenger are associated with the plurality of M input payload search registers.

Further, the Office Action asserts that Messenger discloses a search array coupled to the plurality of M search registers, citing (figures 3a-3e, steps a-i). As discussed in the remarks above, figures 3a-3e relate to a table showing a simple search sequence, which is not a structure disclosing neither a search array, nor a plurality of M search registers, nor the coupling of the two structures. Further, claim 1 requires that *the search array comprises: a plurality of M rows of search array elements; and a plurality of N columns of search array elements.* Messenger fails to disclose or suggest a search array having a plurality of M rows and a plurality of N columns of search array elements or *wherein the search array comprises an array of M by N search array elements.* Figures 3a-3e does not disclose or suggest a structure of search array elements organized into a plurality of M rows and a plurality of N columns because it appears that row (a) in figure 3(a) may relate to a search performed on a search structure, and row (b) may relate to a different search performed later on the same search structure, as would rows (c), (d), (e), etc. All the different searches relate to searches all performed at different times on the

same search structure. Therefore, at best the Messenger search structure may only have a single row or a single column, but no M by N array of search elements.

The rejection asserts that a **plurality of M rows of search array elements** coupled to a plurality of **M output** match lines; is disclosed in col.10, lines 50-55, and col.14, lines 60-65, and that a **plurality of N columns of search array elements** coupled to a **plurality of N pattern input lines** comprising a search pattern; is disclosed in col.18, lines 44-54, and figures 3 and 4f. However, the col.10 citation relates to “match logic including a three-bit match register,” which is a single register, and not a **plurality** of M rows of search array elements. The match register is designated as “M(3)” having a single input line designated M_i and a single output line designated M_o , where the M is an identifier of a single element in figure 4b and does not represent a number of rows. There appears to be no disclosure in the cited material of a plurality of M rows. Therefore, the rejection is unclear as to what structure is associated each claim limitation. The col.14 citation relates to error tolerances, and appears not to have any relevance. Examiner is asked to specifically identify its relevance to claim 1.

Furthermore, the cited figure 4f, appears to be related to the plurality of N pattern input lines appears and appears to disclose 12 pattern input lines, but there is no disclosure or suggestion for coupling the N input lines to the N columns of a M by N search array of elements. At best, figure 4f may appear to disclose a one by N array, but claim 1 at least requires that M is a **plurality**, which is more than one.

The assertion that Messenger discloses in figure 3a that *the content data in the plurality of search registers is replicated and stored in the search array* is also defective because Messenger has failed to disclose or suggest a search array. As discussed above, the table in

figure 3a in Messenger appears to reflect a sequence of searches, wherein the alleged replication of content data is not stored in an array but processed in sequential steps. Further, the limitation has been further amended to more particularly point out and distinctly claim that *the content data in the plurality of M search registers is replicated and stored N times in the plurality of N columns in the search array*. The rejection is unclear because the rejection appears to be piecemeal, wherein the alleged elements cited in Messenger are not applied consistently and uniformly throughout the rejection. For example, figure 4a and 4f, may allegedly contain M search registers or M input lines and “N” output lines, where “N” equals M, but that does not constitute an M by N array of search array elements, which contain content **replicated N times** and **stored** into the **N columns**, which is clearly not disclosed in the cited figures, nor in the entire reference.

Further, there is no disclosure or suggestion of *performing a search query simultaneously within all M rows for the search pattern input by the N pattern input lines in one clock period*. The rejection cites col.8, lines 64-68, which actually teaches away from claim 1. Messenger appears to disclose that “at each clock cycle, ... , the character currently in the cell is compared to a pattern character previously stored in the cell.” However, Messenger precedes this statement with “Operation of the cells is in accordance with a relatively straightforward **logical sequence**, which is identical from cell to cell.” Coupled with the previous remarks regarding figure 3a to 3e, which disclose sequential steps of a search query, all teach that the search query performed by the Messenger rule processor require a plurality of sequential steps requiring a plurality of clock cycles. Thus, Messenger does not disclose or suggest performing a search query **simultaneously within one clock period**. Further, Messenger fails to recognize the advantages of employing an array of M by N search array elements, wherein the content in M

input search registers is replicated and stored N times into the N columns of the array, then the entire array of replicated content can be searched simultaneously within one clock period.

Messenger fails to recognize the advantages of **parallel pattern matching**, which provides the advantage of not having to process one set of content sequentially. Instead the content in a parallel pattern matching device, may be replicated and stored many times into the search array, so that each processing step can be performed on each replicated copy stored in the search array, all at the same time, thus processing in parallel, and not sequentially.

In contrast, the rejection, which cited Messenger, col. 5, lines 37-56, fails to disclose or suggest *performing one or more contextual searches on content in the search array via parallel pattern matching*, and in fact teaches away from claim 1. The cited material in Messenger states that “the **processor requires** that text be passed **through it** in a serial fashion, and **match indication signals** emerge from the processor in synchronism with the text and on a line that parallels the character line.” The cited material above, used in the rejection, relates to the output signals on the output line from the processor paralleling the input signal on the input signal line, which appears to have nothing to do with whether or not the internal workings of the processor employ a parallel pattern matching architecture. The rejection appears to be the result of a piecemeal analysis of the prior art and the claims. The rejection relies on terms cited in Messenger, which are taken out of context, but when read in context either are irrelevant to the claimed subject matter or actually teach away from it.

A **processor**, which **requires** that text be passed **through it** in a serial fashion, is not a processor having **parallel pattern matching** architecture. Further, the cited material above discloses multiple search queries, but the results of these multiple queries are placed on additional lines in the results pipeline, which must also include collision avoidance means to

insure that results are not lost due to “overlap in their times of occurrence.” This seems to suggest a serial architecture, and not a parallel architecture.

Independent claim 67 is a method claim, comprising similar limitations to claim 1 and applicants assert that Messenger suffers from similar deficiencies as discussed above. In view of the above remarks, the dependent claims include additional limitations over the independent claims, and thus, should also overcome the rejection.

Nonetheless, claim 69 relates to the additional limitation that *loading the search registers is performed to store, replicate, and **interleave data** such that data for one row is stored in an adjacent row in shifted form*. In contrast, the rejection cites col. 7, lines 64-67, and figure 3a, in Messenger, which appears to be defective. Figure 3a, as discussed above, relates to a sequence of search steps, and not to a structural search array having a plurality of rows and columns. A sliding window search, such as in Messenger, involves shifting the window or data after each text matching processing step. However, Messenger fails to disclose or suggest that the text data is replicated in shifted form and stored into a search array repeatedly until the array is filled up, thus enabling the processor to perform a plurality of text matching processing steps, all in a single step by means of parallel processing the entire search array in a single step. Messenger is incapable of such parallel processing, at least in part, because Messenger fails to contain a search array structure capable of replicating and storing a plurality of shifted copies of the text to be searched.

Applicants, accordingly, respectfully request withdrawal of the rejections of claims 1-25 and 27-70 under 35 U.S.C. § 102(b) as being anticipated by Messenger.

Claim Rejections under 35 U.S.C. §103(a)

The Examiner has rejected claims 71-72 under 35 U.S.C. §103(a) as being unpatentable over Messenger as applied to claims 1-70 above and in further in view of U.S. Patent No. 5,050,075 of Herman et al. ("Herman"). In light of the amendment and the above remarks, the Examiner's rejections are traversed and are asserted to have been overcome. Applicants request that if the rejection is substantially maintained, then the rejection comply with MPEP §707.07(f), which requires that the Examiner answer **all material traversed**. MPEP §707.07(f) specifically states that, "where the applicant traverses **any rejection**, the examiner should, if he or she repeats the rejection, take note of the applicant's argument and **answer the substance of it.**" (emphasis added).

Applicants assert that the deficiencies identified in Messenger are also relevant to claim 71, and that Herman, which was introduced to allegedly disclose a means for decoding instructions, also fails to remedy the deficiencies of Messenger.

Claim 71 reads as follows:

A process for performing contextual searches in a pipelined fashion, the process comprising:
fetching a rule from a rule memory;
decoding the rule and assembling indirect fields, if any;
storing a replication of content in a plurality of input payload search registers in a search array coupled to the registers,
wherein the search array comprises:

a plurality of M rows of search array elements coupled to a plurality of M output match lines; and

*a plurality of N columns of search array elements coupled to a plurality of N pattern input lines comprising a search pattern, wherein the search array comprises **an array of M by N search array elements**, wherein the storing of the replication of content comprises **replicating and storing the content in the M input payload search registers N times, once in each of the N columns of search array elements**, wherein the **row positions** of the replicated content within each column of the N columns of search array elements is **shifted** relative to the row positions of the replicated content in each of its **adjacent columns** of search array elements;*

executing one or more search operations on values in the search array; and

performing sort operations on results of executing the one or more search operations.

(Amended claim 71)(emphasis added).

Neither Herman nor Messenger disclose or suggest a **search array** comprising: a **plurality of M rows of search array elements**; or a **plurality of N columns of search array elements**, nor wherein the search array comprises **an array of M by N search array elements**, nor wherein the **replicating and storing the content in the M input payload search registers N times, once in each of the N columns of search array elements**, nor wherein the **row positions of the replicated content within each column of the N columns of search array elements is shifted** relative to the row positions of the replicated content in each of its **adjacent columns** of search array elements. Further, neither Herman nor Messenger disclose, suggest, or recognize the advantages of simultaneously processing N process steps having M rows of data in only one step of cycle time, so there would be no motivation to modify either reference to form an **M by N search array**, nor to **replicate N times** the text data to store in the array, nor to **shift** the replicated data in adjacent columns.

In view of the above remarks, the dependent claims include additional limitations, which should also overcome the rejection.

Applicants, accordingly, respectfully request withdrawal of the rejections of claims 71-72 under 35 U.S.C. § 103(a) as being unpatentable over Messenger in view of Herman.

Response to Arguments

The Examiner argues in the Office Action that “Messenger teaches his system being able to handle multiple queries simultaneously, which corresponds, to a parallel matching technique as described.” Applicants traverse this assertion because the rejection fails to identify in Messenger any of the features that are used to describe a parallel matching technique, as discussed above. The rejection merely identifies words in the reference with words in the claims, without regard to the context surrounding those words. The use of the word “simultaneously” in Messenger appears to refer to performing multiple tasks by devoting some of the input lines for the other tasks, but the many steps of all those tasks are still performed sequentially, using many clock periods to perform the tasks. However, in parallel processing architecture, the many steps of a task are performed in one clock period, or in parallel. The processor in Messenger does not disclose or suggest a parallel processor architecture. Instead Messenger repeatedly discloses a sequential processor.

The rejection identifies the word “parallel” in Messenger, but the context surrounding the use of the word has nothing to do with parallel processing. Instead, Messenger uses the word “parallel” with regard to the output signal “**paralleling**” the input signal, which appears not to be at all relevant to parallel processing. The word “parallel” in the rejection is taken out of context.

Applicants assert that the rejections are improper because the references fail to disclose or suggest all the features of the claims and because the rejection fails to take the claimed invention as a whole, wherein the features are integrated together to produce a desired result, such as an M by N search array having N replicated data to simultaneously search the entire array in one clock cycle, in parallel. The unique combination of these features enable parallel pattern matching architecture, which Messenger fails to disclose or suggest all these features, nor any type of parallel processing architecture, and in fact teaches away from the claimed invention by disclosing the use of a sequential processing architecture.

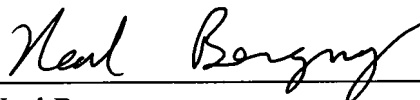
CONCLUSION

Applicants respectfully submit that the applicable rejections and objections have been overcome. At the request of the representative for the applicants, the Examiner has agreed to conduct a telephone conference when the Examiner is ready to work on the present application. The Examiner is invited to call Neal Berezny at (408) 962-7563 or at (408) 720-8300, to schedule the interview, or to address any other issue that would help expedite prosecution of this application.

Pursuant to 37 C.F.R. 1.136(a)(3), applicant(s) hereby request and authorize the U.S. Patent and Trademark Office to (1) treat any concurrent or future reply that requires a petition for extension of time as incorporating a petition for extension of time for the appropriate length of time and (2) charge all required fees, including extension of time fees and fees under 37 C.F.R. 1.16 and 1.17, to Deposit Account No. 02-2666.

Respectfully submitted,
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